Figs. 11A to 11H are diagrams showing electric equipment having light emitting devices to which a repairing method of the present invention is applied;

Figs. 12A and 12B are respectively a sectional view of an EL element having a defect portion and a diagram schematically showing the current flow when a forward bias current flows in the EL element;

Figs. 13A and 13B are diagrams showing the voltage-current characteristic of EL elements;

Fig. 14 is a graph showing the voltage-current characteristic of an EL element when a reverse bias current flows therein;

Fig. 15 is a diagram showing the voltage-current characteristic of an EL element;

Fig. 16 is a sectional view of a light emitting device;

Fig. 17 is a sectional view of a light emitting device;

Fig. 18 is a sectional view of a light emitting device; and

Figs. 19A and 19B are diagrams of a passive matrix light emitting device to which a repairing method of the present invention is applied.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

[Embodiment Mode]

A fabricating and/or repairing method of the present invention will be described with reference to Figs. 1A and 1B. Fig. 1A is a diagram schematically showing the current flow in an EL element having a defect portion when a reverse bias voltage is applied to the EL element.

A ground voltage GND and a reverse bias voltage V_{rev} are alternately applied to the EL element. Fig. 1B is a timing chart of when the ground voltage GND and the

reverse bias voltage V_{rev} are alternately applied. Note that the present invention is not limited to the structure of this embodiment mode, namely, alternate application of the ground voltage GND and the reverse bias voltage V_{rev}. The invention only requires application of a reverse bias voltage to the EL element. Accordingly, the combination of voltages to be applied alternately to the EL element may be a combination of a forward voltage and the reverse bias voltage V_{rev}, or a combination of the reverse bias voltage V_{rev} and a reverse bias voltage that is not equal with V_{rev}.

In this embodiment mode, the reverse bias voltage is applied to the EL element at given time intervals. However, the present invention is not limited thereto and a direct reverse bias voltage may be applied to the EL element.

The reverse bias voltage is gradually increased until avalanche takes place to cause an avalanche current to flow into the EL element in this embodiment mode. The voltage at which the avalanche current starts to flow into the EL element is herein called an avalanche voltage. However, the present invention is not limited thereto and the level of voltage to be applied to the EL element can be set suitably by a designer. An appropriate level of voltage applied to the EL element is high enough to transmute the defect portion but is not so high as to damage the El element or degrade its EL layer.

The voltage level is gradually increased also when the voltage is a direct reverse bias voltage.

Alternatively, a reverse bias voltage of constant level may be applied to the EL element at given time intervals or a direct reverse bias voltage of constant level may be applied.

By applying a reverse bias voltage to the EL element at given time intervals, it is possible to prevent a part of the EL layer that surrounds the defect portion from

being degraded by heat generated from application of the reverse bias voltage.

The gradual increase in level of the reverse bias voltage makes it easy to find the level of reverse bias voltage that is optimal for repairing that particular EL element.

When the reverse bias voltage V_{rev} is applied to the EL element, a reverse bias current I_{rev} flows into the EL element. The reverse bias current I_{rev} satisfies $I_{rev} = I_{dio} + I_{SC}$, wherein I_{dio} represents a current flowing in an EL layer 103 and I_{SC} represents a current flowing in a defect portion 104. However, the reverse bias current hardly flows into the EL layer and $I_{rev} \fallingdotseq I_{SC}$ is assumed.

When the current I_{rev} flows into the defect portion 104, the temperature in the defect portion 104 is raised to cause burnout of the defect portion, vaporization of the defect portion, or transform of the defect portion into an insulator due to oxidization or carbonization, thereby changing the defect portion into the transmuted portion. A resistance R_{SC} is thus increased.

Fig. 2A shows a change with time in voltage-current characteristic of the EL element having the defect portion 104 when the repairing method of the present invention is employed. The voltage-current characteristic curve shifts with time toward directions indicated by arrows. V_{av} represents the avalanche voltage. Upon application of a reverse bias voltage, the resistance R_{SC} of the defect portion increases as the time elapses accompanied by reduction of the current I_{SC} that flows through the defect portion. The amount of current flowing into the EL element is thus reduced.

Fig. 2B schematically shows the current flow in the EL element when a forward bias voltage is applied to the EL element. A reduction of the current I_{SC} flowing through the defect portion results in an increase in current I_{dio} that actually flows into the EL layer when a forward bias voltage is applied to the EL element, thereby raising the luminance of emitted light.